REMARKS

Enclosed is a copy of Fig. 2 with a requested change in red ink to include an indication of a passage at 120X. Also enclosed are five sheets of formal drawings, with the change in Fig. 2 included in the formal drawings.

Applicant has amended the specification to provide a consistent description of the passage 120 at a second position 120X, and to correct minor errors that applicant has noticed in re-reading the specification.

Applicant has canceled claims 2, 8, 10-12 and 15-17, amended claims 1, 3-5, 7, and 9, and added new claims 18-22. Accordingly, only claims 1, 3-7, 9, 13-14, and 18-20 remain in the application. Of the remaining claims, all but Claim 4 were rejected on references. Applicant has carefully studied the Examiner's objections, in an attempt to make all of the remaining claims definite.

Claim 1, which has been amended, describes a transfer module such as shown, for example, in applicant's Fig. 4, where a stator means (e.g. 175, which includes stator elements or parts 174, 184) has a pair of primary stator passages (172, 182) and a pair of secondary stator passages (131, 192). A shuttle (170) has an aliquot passage (120A) with opposite end portions. Each of the opposite end portions of the aliquot passage is aligned with one of the primary stator passages (at 190, 191) in a first shuttle position and aligned with one of the secondary stator passages (131, 192) in the second shuttle position. An actuator (141 in Fig. 2) is connected to the shuttle, the actuator being constructed to automatically move the shuttle repeatedly between only the first and second positions. Applicant notes that applicant's Fig. 6 shows another transfer module with a stator means (252) having a pair of primary stator passages (260, 262) in the same element.

Claim 1 was rejected as shown by Yoshida (4,520,108) or as shown by Laursen (6,096,276). Yoshida shows, in his Fig. 1A, that he first passes a sample from 52 into a sample metering pipe 56 to fill it, while a valve 70 is in a first position and fluid is pumped by pump 80. Later, his valve 70 is switched, and a reagent 42 passes into two metering pipes 46, 48 on their way to the switch valve 70 and out through the pump 80. In his Fig. 1B, he has turned his large rotary valve 60, so carrier fluid pumped by his pump 12, passes through all three metering pipes 46, 56, and 48, to flow to a reaction coil 16 where the sample and reagent react with each other, and the results are measured by his detector 30.

First of all, Yoshida does not relate to passing a small portion of a continuous high flow rate primary stream along a continuous secondary stream. His continuous high flow rate primary stream of carrier liquid at 14, always passes through his detector 30, and never through his valve 70 and pump 80. Second, Yoshida is not related to splitting a primary stream to flow a small portion of it along a secondary stream. Yoshida does not have any continuous secondary stream. Furthermore, Yoshida does not show or mention an actuator connected to his rotary valve 60 to automatically move the rotor of his valve repeatedly back and forth. As mentioned above, even if he did, he is not splitting the main flow moving along his conduit 10 to flow a portion of it continuously out through his pump 80.

Laursen shows, in his Fig. 1, an inlet 41 that flows amino acids into a selected one of several reaction vessels such as 1. It appears that he has previously loaded the other reaction vessels 2-8 with samples to be reacted with. By turning his rotor, he can flow the contents of one of his reaction vessels 2-8 into his vessel 1 to produce a reaction that flows out through his outlet 50. When he is not pumping in amino acids into his inlet 41, his inlet is shut down or he is flowing a wash liquid into his inlet 41. Assuming the inflow at 41 is a continuous primary stream, Laursen does not show his input at 41 being split into a continuous

secondary stream in addition to the main outlet path 50. Also, Laursen does not suggest an actuator connected to his rotor 10 that automatically moves his rotor repeatedly back and forth between only first and second positions.

Claim 3, which has been amended, was rejected as obvious over Laursen in view of Proni (4,957,008). Claim 3 describes a bypass (e.g. 154 in applicant's Fig. 3 or 176 in applicant's Fig. 4) which is connected in parallel with said primary passages and which is large enough to pass fluid therethrough at a flow rate that is a plurality of times the flow rate through the aliquot passage (e.g. 120 in Fig. 3 or 120A in Fig. 4). Laursen does not show any bypass to connect conduits 41, 50 without passing through a rotor passage at 1-8. Proni shows loops 46, 48, 50 in his Fig. 5. Although the outside diameter of his loops are larger than the inside diameters of his passageways 98 or recesses 108', the inside diameters of the tubes forming his loops appear to have the same diameters as passages 98 and recesses 108'. There is no indication in Proni that he has a bypass having a large enough cross section to pass fluid through it at a plurality of times the flow rate through a smaller passage. In addition, neither Laursen nor Proni are related to a device for splitting off a small continuous secondary stream from a larger continuous high-flow primary stream, which is what the present invention relates to. Accordingly, neither reference is analogous art and cannot be used under 214101(a), that is, an engineer aware of the prior art shown in applicant's Fig. 1 for splitting a high flow rate stream so as to obtain a low flow rate secondary stream, would not turn to the description of Laursen, which has reaction vessels that react different chemicals rather than splitting a stream, or Proni, which stores liquid samples prior to reacting them.

Claim 4 has been amended to avoid indefiniteness and make the claim clearer. However, Claim 4 was not rejected on any reference.

Claim 5, which depends from Claim 1, and which has been amended, describes a construction such as shown in applicant's Fig. 6, where the stator means includes a single stator part (252) containing both primary passages and secondary passages. The primary passages (260, 262) have larger cross-sections than the secondary passages (270, 272). Neither Yoshida nor Proni show primary passages having larger cross-sections than secondary passages.

Claim 6, which depends from Claim 5, describes the stator forming a bypass (e.g. 290 in applicant's Figs. 7 and 8) that connects together both of the primary passages and that connects them to the aliquot passage. Yoshida does not show any such bypass. Jungner shows a device with filters, with a rotor or block 2 that can be turned. First, he rotates his block 2 to connect the input at one of his connections 6 to a vacuum to pull in a sample to be filtered. At the same time, another liquid such as bleach is passed through a second filter to a vacuum. Jungner does not show any bypass that connects two primary passages at a stator face and with an aliquot passage open to the bypass.

Claim 7, which has been amended to avoid an indefiniteness, depends from Claim 1. Claim 7 describes a system such as shown in applicant's Fig. 2, where a source of high-pressure fluid 12 and 14 is connected through primary stator passages to an analyte receiver (108 in Fig. 2) having containers that receive the analytes. The claim also describes a separate source of pressured carrier fluid (132 and 134) connected through secondary stator passages to an analyzing instrument (34). Laursen does not show two sources of pressured carrier fluid. Baldwyn (4,836,038) injects samples (from 18) and uses a solvent line 60 (his Figs. 1 and 2) to push the samples along, a wash reservoir 102 for washing out his tube 20, and a waste receiver 82. He does not show the output of his syringe 18 of limited capacity, being split into a main path and a secondary stream. Sanuki (5,447,691) relates to pumping samples, reagents, etc. to analyzing devices. He does not

suggest splitting a continuous stream. None of the references suggest splitting a continuous stream into a secondary stream and a main path. Accordingly, the above three references applied against Claim 7 constitute art that is not analogous to the apparatus of Claim 7. That is, an engineer trying to design a better device for splitting a continuous high flow rate stream, would not turn to any of these three references.

Claim 9, which depends from Claim 1, was rejected as obvious over Laursen in view of Stone. Claim 9 describes moving the shuttle between the two positions at a rate on the order of magnitude of one back-and-forth movement per second. Laursen does not suggest back-and-forth movement between two positions, since his rotor is moved selectively between eight positions and there is no indication that it would be moved as rapidly as described in Claim 9. Stone describes a sampling valve "for obtaining discontinuous samples" (col. 1, l2) from liquid streams. Thus, he produces discontinuous streams rather than continuous streams. There is no indication that Stone would cycle his rotor back and forth at such a high rate as once per second, since he is not trying to create a substantially continuous secondary stream containing analytes.

Claim 13 describes a construction such as shown in applicant's Fig. 6, where a stator (252) has a bypass (290 in Figs. 7 and 8) where the stator passages are connected together to flow most of the fluid from one (260) to the other (262) while the bypass is open to the aliquot passage (280) in the rotor. None of the references remotely suggest this. Yoshido's Fig. 4A shows pairs of passages that are connected together only by a rotor passage, rather than connected together at a stator bypass that allows fluid to flow from one primary passage to another, with a little ending up in the aliquot passage. Jungner does not show any bypass passage that connects together two primary passages. Wylie shows a fluid control valve, with the passages such as 20, 22, 24 not connected together at an interface, but

only through his chamber 10. Wylie is not related to splitting a main stream, and therefore is non-analogous art. Bakalyar shows passages 34-42 in his stator that are connected together only through a channel 46 in his stator or channels 50, 52 in his rotor. Bakalyar does not split a primary stream and is non-analogous art.

Claim 14, which depends from Claim 13, describes the shuttle having a plurality of different aliquot chambers of different volumes (e.g. 302, 304, 306 in Figs. 9-12). None of the references Yoshida, Jungner, Wylie, nor Bakalyar remotely suggest this or apparatus for splitting a primary stream.

New Claim 18 describes a transfer module for splitting a primary stream while flowing most of it through a large diameter tube and a small portion through a small diameter tube. The claim also describes an actuator that repeatedly moves a shuttle between only first and second positions, at a rate on the order of magnitude of one back and forth movement per second. As discussed above in the case of Claim 9, none of the references are relevant to splitting a primary stream to flow most along a large diameter tube and a smaller amount along a secondary tube, and none of the references suggest repeatedly moving a shuttle back and forth at a rate on the order of magnitude of one back-and-forth movement per second.

New Claim 19, which depends from Claim 18, describes primary and secondary pumps connected one to the large diameter tube and one to the small diameter tube, and with the secondary pump flowing at a rate less than 10% of the rate of the primary pump. None of the references suggest this.

Claim 20 describes a method for modularly transforming a portion of a high flow rate primary stream, which is what the apparatus of Claim 1 accomplishes. The method includes repeatedly moving a shuttle between first and second positions at a back-and-forth rate of at least two every ten seconds. None of the

references show repeatedly moving a shuttle back and forth at such a rate of at least one movement every five seconds.

Claim 21, which depends from Claim 20, describes flowing fluid through a bypass connection on the stator. As discussed above in the case of Claim 13, none of the references suggest flowing fluid between primary passages through a bypass connection on a stator.

New Claim 22, which depends from Claim 20, describes flowing almost all fluid along a main path and flowing no more than about 1% of the main path flow rate along a secondary path. None of the references show such extreme splitting.

In view of the above, favorable reconsideration of the application is courteously requested. If the Examiner should wish to discuss the Application, she is invited to call Leon D. Rosen at (310) 477-0578.

Respectfully submitted,

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